

## CLAIMS

What is claimed is:

1. A method for receiving data fields transmitted using block space time transmit diversity (BSTTD) in a code division multiple access (CDMA) communication system, the method comprising the steps of:

transmitting a first data field using a first antenna, and a second data field using a second antenna; the second data field produced by rearranging blocks of the first data field;

receiving the first data field and the second data field;

generating a signal model ignoring interference between the data blocks;

and,

determining transmitted data symbols of the first data field and the second data field utilizing minimum mean square error block linear equalization, approximate Cholesky decomposition, and forward and backward substitution.

2. The method of claim 1 wherein the received data fields are processed by a whitening matched filter.

3. The method of claim 2 wherein the received data fields are processed by a channel estimator generating channel information to be used in determining transmitted data symbols.

4. The method of claim 3 wherein the first data field comprises data blocks of  $D1$  and  $D2$ , and the second data field comprises data blocks of  $-D2^*$  and  $D1^*$ , wherein  $*$  denotes a conjugate of the corresponding data block.

5. A receiver for recovering data fields transmitted from a block space time transmit diversity (BSTTD) transmitter which transmits a first data field using a first

antenna and a second data field using a second antenna, the second data field produced by rearranging blocks of the first data field, the receiver comprising:

an antenna for receiving a vector comprising both the first data field and the second data field; and,

a BSTTD joint detector for determining transmitted symbols of the first data field and the second data field utilizing minimum mean square error block linear equalization, approximate Cholesky decomposition, and forward and backward substitution, while ignoring interference between data blocks.

6. The receiver of claim 5 further comprising a whitening matched filter to process the received data fields.

7. The receiver of claim 6 further comprising a channel estimator to generate channel information.

8. The receiver of claim 7 wherein the first data field comprises data blocks of  $D_1$  and  $D_2$ , and the second data field comprises data blocks of  $-D_2^*$  and  $D_1^*$ , wherein  $*$  denotes a conjugate of the corresponding data field.

9. A CDMA communication system for recovering data fields transmitted using block space time transmit diversity (BSTTD), the system comprising:

a transmitter transmitting a first data field using a first antenna and a second data field using a second antenna, the second data field produced by rearranging blocks of the first data field; and

a receiver for receiving data fields transmitted using BSTTD comprising:

an antenna for receiving a vector comprising the first data field and the second data field; and,

a BSTTD joint detector which utilizes minimum mean square error block linear equalization, approximate Cholesky decomposition, and forward and

backward substitution to determine symbols of the first data field and the second data field, while ignoring interference between data blocks.

10. The system of claim 9 further comprising a whitening matched filter to process the received data fields.

11. The system of claim 10 further comprising a channel estimator to generate channel information.

12. The system of claim 11 wherein the first data field comprises data blocks of  $D1$  and  $D2$ , and the second data field comprises data blocks of  $-D2^*$  and  $D1^*$ , wherein  $*$  denotes a conjugate of the corresponding data field.